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# मानक

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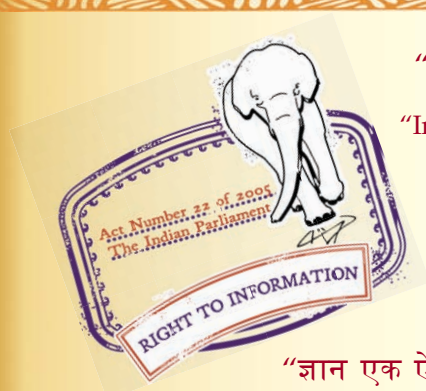
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IS 11705 (1986): Positive List of Constituents of Ethylene/acrylic Acid (Eaa) Copolymers for Their Safe Use in Contact with Foodstuffs, Pharmaceuticals and Drinking Water [PCD 12: Plastics]

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Bhartrhari—Nitiśatakam

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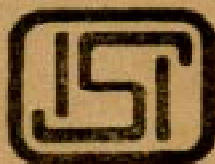
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*Indian Standard*

POSITIVE LIST OF  
CONSTITUENTS OF ETHYLENE/ACRYLIC  
ACID ( EAA ) COPOLYMERS FOR  
THEIR SAFE USE IN CONTACT WITH  
FOODSTUFFS, PHARMACEUTICALS  
AND DRINKING WATER

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**INDIAN STANDARDS INSTITUTION**

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

NEW DELHI 110002

# Indian Standard

## POSITIVE LIST OF CONSTITUENTS OF ETHYLENE/ACRYLIC ACID ( EAA ) COPOLYMERS FOR THEIR SAFE USE IN CONTACT WITH FOODSTUFFS, PHARMACEUTICALS AND DRINKING WATER

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# *Indian Standard*

## POSITIVE LIST OF CONSTITUENTS OF ETHYLENE/ACRYLIC ACID ( EAA ) COPOLYMERS FOR THEIR SAFE USE IN CONTACT WITH FOODSTUFFS, PHARMACEUTICALS AND DRINKING WATER

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 15 September 1986, after the draft finalized by the Plastics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

**0.2** Plastics are now being used on a large scale for packaging of food-stuffs and pharmaceuticals. Where direct contact occurs between the packed commodity and the plastics, the high-molecular-mass polymer itself, being inert and essentially insoluble in food does not pose a toxic hazard. There is, however, a likelihood that some transfer of polymer additives, adventitious impurities, such as monomers, catalyst remnants and residual polymerization solvents, and low molecular mass polymer fraction may occur from plastics into the packaged material with consequent toxic hazard to the consumers. The occurrence of acute toxicity due to plastics materials in contact with food is most unlikely since only trace quantities of potentially toxic materials are likely to migrate. However, accumulation of toxic materials with time may lead to hazards which may be serious.

**0.3** Ethylene/Acrylic Acid (EAA) copolymers are produced with varying acrylic acid content, 3 to 25 percent, and melt indices from 1 to 3 000 depending on the fabrication method and the end use application requirements. By precise control of copolymerization process and recipes, copolymers with precise molecular design and accurate co-monomer content are produced which are competitive and have improved adhesive properties.

EAA copolymer product range consists of a low melt index group of copolymers for extrusion coating, blown and cast film production and

a high melt index family of polymers designed for hot melt adhesives and water dispersions. The distinctiveness of EAA copolymer resin lies in the following areas:

- a) Adhesion to aluminium foil,
- b) Adhesion to nylon,
- c) Hot tack,
- d) Heat sealability,
- e) Low sealing temperature, and
- f) Moisture resistance.

The improved properties offered by EAA copolymer results in flexible packages with improved performance in areas such as seal integrity ( few leakers ). EAA copolymer through extrusion coating or co-extrusion in blown or cast films may be combined with other polymers to give film structures. Potential film structures include nylon/EAA copolymer, polyester/aluminium foil/EAA copolymer, HDPE/EAA copolymer, biaxially oriented polypropylene/EAA copolymer and LDPE/EAA/aluminium foil/EAA copolymer.

**0.4** This standard is intended to be used with the following series of Indian standards on plastics for food contact applications:

- IS : 9833-1981** Classification of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 9845-1981** Method of analysis for the determination of specific and/or overall migration of constituents of plastics materials and articles intended to come into contact with foodstuffs
- IS : 10141-1982** Positive list of constituents of polyethylene in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 10142-1982** Styrene polymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 10146-1982** Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 10148-1982** Positive list of constituents of polyvinyl chloride ( PVC ) and its copolymers in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 10149-1982** Positive list of constituents of styrene polymers in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 10151-1982** Polyvinyl chloride ( PVC ) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water



- IS : 10171-1982 Guide on suitability of plastics for food packaging
- IS : 10909-1984 Positive list of constituents of polypropylene and its copolymers in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 10910-1984 Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 11434-1985 Ionomer resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 11435-1985 Positive list of constituents of ionomer resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
- IS : 11704-1986 Ethylene/acrylic acid ( EAA ) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

**0.4.1** Standards for other plastics for food contact applications under preparation are expected to follow the same pattern, namely, a product specification with a corresponding positive list.

**0.5** It is emphasized that these standards need to be used in combination to provide a system of control to the manufacturers of plastics as well as the fabricators of thermoplastic packaging materials to derive maximum benefits. Besides, it may also serve as a basis for official agencies to frame suitable legislation to ensure effective safeguards for the safety and health of consumers where thermoplastics for food contact applications are concerned.

## 1. SCOPE

**1.1** This standard covers positive list of constituents of ethylene/acrylic acid ( EAA ) copolymers, manufacturing residues and necessary additives which may be regarded as safe for use when properly processed, in contact with foodstuffs, pharmaceuticals and drinking water, when present only in the prescribed limits of concentrations.

**1.2** It does not purport to establish suitability of ingredients, singly and in a particular foodstuff from other than toxicological considerations.

## 2. TERMINOLOGY

**2.0** For the purpose of this standard, ethylene/acrylic acid copolymers shall mean the following.

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\*Rules for rounding off numerical values ( revised ).

**2.1 Ethylene/Acrylic Acid (EAA)** — A basic resin produced by polymerization of ethylene and acrylic acid at high pressure.

**2.2 Additive Concentrates** — A resin produced by making up a master batch of a slip agent and/or an antiblock agent in an ethylene-acrylic acid copolymer for use only in contact with food after being let down into an ethylene acrylic acid copolymer or other compatible polymer which may come in contact with food.

### 3. REQUIREMENTS

#### 3.1 Basic Resins

**3.1.1** In ethylene/acrylic acid copolymers, the acrylic acid content shall not exceed 10 percent by mass.

**3.1.2 Additive Concentrates** — The total level of slip agent and/or anti-block agent added to the acid copolymer shall not exceed 25 percent by mass prior to let-down. Amount of slip agent is determined by solvent extraction and infrared spectrometry. Anti-block agent amount is determined by ash content on pyrolysis of the resin.

**3.1.3 General** — To comply with this list, the resins defined in **3.1.1** and **3.1.2** shall be made in such a way that they contain no ingredients or residues of ingredients used in their manufacture other than those listed in **3.2** and/or coming within the provisions of **3.3**.

**3.2 Manufacturing Residues** — The basic resins may contain a volatile content of not more than 0.5 percent by mass of ethylene, propene, acrylic acid, organic peroxides or their decomposition products and inert odourless, mineral spirits. The volatile content is determined by thermogravimetric analysis (TGA) at 176.6°C. This measures mass loss under a nitrogen atmosphere.

#### 3.3 Auxiliary Items for Working

**3.3.1** The total lubricant content shall not be more than 2 percent by mass of finished resin except in those cases wherein it is specifically prescribed. Lubricant content is determined by solvent extraction and infrared spectrometry.

**3.3.1.1** The following lubricants may be present:

- a) Stearamide ( 0.2 percent, *Max* ; )
- b) Oleyl Palmitamide ( 0.2 percent, *Max* );
- c) Behenamide ( 0.2 percent, *Max* );
- d) Polyethylene;
- e) Erucamide ( 0.2 percent, *Max* );

- f) Dioleoyl ethylene diamine ( 1 percent, *Max* );
- g) Polybutene;
- h) Stearyl erucamide ( 0.2 percent, *Max* );
- j) Distearyl ethylene diamine ( 1 percent, *Max* );
- k) Dimethylpolysiloxane;
- m) Linoleamide ( 0.2 percent, *Max* ); and
- n) Palmitamide ( 0.2 percent, *Max* ).

**3.3.2 Anti-Block Agents** — The total anti-block additive content shall not be more than 2 percent by mass of finished resin except in those cases wherein it is specifically prescribed as in the additive concentrates. The amount of anti-block agent in the polymer may be determined by ash content on pyrolysis.

**3.3.2.1** The following anti-block agents may be present:

- a) Silica,
- b) Aluminium calcium silicate,
- c) Calcium silicate,
- d) Magnesium silicate,
- e) Sodium aluminosilicate,
- f) Sodium calcium aluminosilicate,
- g) Tricalcium silicate,
- h) Titanium dioxide,
- j) Aluminium oxide,
- k) Magnesium oxide,
- m) Zinc oxide,
- n) Aluminium silicate, and
- p) Kaolin clay.

**3.3.3 Antioxidants** — The total antioxidant content shall not be more than 1.5 percent by mass of finished resin. Total antioxidant content is determined by solvent extraction and infrared spectrometry.

**3.3.3.1** Any of the antioxidants prescribed in **3.4.2** of IS : 10141-1982\* may be used.

**3.3.4 Antistatic and/or Antifogging Agents** — The total antistatic and/or antifogging agent concentration shall not exceed 0.5 percent by mass. Amount of antistatic and/or antifogging agent present is determined by solvent extraction and infrared spectrometry.

**3.3.4.1** Any of the antistatic and/or antifogging agents prescribed in **3.4.3** of IS : 10141-1982\* may be used.

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\*Positive list of constituents of polyethylene in contact with foodstuffs, pharmaceuticals and drinking water.

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